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## APPLICATIONS OF HIGH RESOLUTION GAMMA RAY SPECTROSCOPY

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At the Institut Laue Langevin gamma rays emitted after neutron capture can be recorded with ppm resolution. This is achieved by diffracting gamma rays on highly perfect Si and/or Ge crystals. The high resolving power allows one to observe the tiny Doppler effects caused in de-excitation processes of nuclei following neutron capture. Thereby recoils can be induced by the subsequent emission of gamma rays or, in various beta decay scenarios, by the emission of electrons and/or neutrinos. The structure of the measured Doppler profiles depends on the magnitude of the original recoil velocity, the slowing down time of the recoiling nuclei in the sample and the lifetimes of the excited nuclear states that are populated subsequently to the recoil. Ultra high resolution gamma ray measurements have given rise to applications in nuclear, fundamental and condensed matter physics. We will present some of the currently possible applications.